

‘ was cured, and well able to walk, before he left
 ‘ his said Master ; and do believe it was performed
 ‘ without any Art or Assistance whatever, than as
 ‘ exprefs’d above ; as witness our Hands,

‘ *Mabella Glover.*

‘ *Eliz. Glover.*

‘ *Susannah Jasper, the*
 ‘ Boy’s own Aunt.’

The foregoing Account of the Cripple *Nicolas Reeks* was drawn up in such Terms as were most agreeable to the Apprehensions of the Persons who have certified the Truth of the Fact, and to whom it was first read : And I am well satisfied in the Credibility of their Testimony, and that many other Persons of Reputation might be called on, who would sign the same.

Customhouse, Poole,
Nov. 11. 1749.

W. MILNER.

XI. *A Letter from Mr. James Short, F.R.S. to the President, with the Description and Uses of an Equatorial Telescope.*

S I R,

Read, Dec. 7.
 1749.

I Send you along with this the Description and Uses of the Equatorial Telescope, as also a Drawing of it ; which you desired of me some time since, in order that it might be laid before the Society. I have made three of these Instruments, one of which was bought by Count *Bentink*

H h

for

for the Prince of *Orange*; the other two I have still by me, one of which I shall shew to the Society. I do not pretend to any-thing new in the Combination of these Circles, of which this Instrument consists, the same Combination having several times been made before me, by way of a Dial: But I believe the putting so large a Telescope upon this Machinery, and applying it to the Uses which I have done, is some what new. I am,

S I R,

Surry-street, 7th Your most obedient humble Servant,
Dec. 1749.

JA. SHORT.

*Description and Uses of the Equatorial Telescope,
 or Portable Observatory.*

THIS Instrument consists of two circular Planes or Plates, mark'd *AA* in the annexed Drawing, *Tab. III.* which are supported upon four Pillars; and these are again supported upon a Cross-foot, or Pedestal moveable at each End by the four Screws *BBBB*: The two circular Plates *AA* are moveable, the one above the other, and are called the horizontal Plates, as representing the Horizon of the Place; and upon the upper one are placed two Spirit-Levels, to render them at all times horizontal: These Levels are fixed at Right-Angles to one another: This upper Plate is moved by a Handle *C*, which is called the Horizontal Handle, and is divided into 360° , and has a *Nonius* Index divided into every three Minutes,

Above this horizontal Plate there is a Semicircle *DD*, divided into twice 90° ; which is called the Meridian Semicircle, as representing the Meridian of the Place,

Place, and is moved by a Handle *E*, which is called the Meridian Handle, and has a *Nonius* Index divided into every three Minutes.

Above this Meridian Semicircle is fasten'd a circular Plate, upon which are affixed two other circular Plates *FF*, moveable the one upon the other, and are called the Equatorial Plates; one of them, representing the Plane of the Equator, is divided into twice 12 Hours, and these are subdivided into every 10 Minutes of Time. This Plate is moved by a Handle *G*, called the Equatorial Handle, and has a *Nonius* Index for shewing every Minute.

Above this Equatorial Plate there is a Semicircle *HH*, which is called the Declination-Semicircle, as representing the Half of a Circle of Declination, or horary Circle, and is divided into twice 90°, being moved by the Handle *K*, which is called the Declination-Handle. It has also a *Nonius* Index for subdividing into every three Minutes.

Above this Declination-Semicircle is fastened a Reflecting Telescope *LL*, of the *Gregorian* Construction, the focal Length of its great Speculum being 18 Inches.

In order to adjust the Instrument for Observation, the first thing to be done, is to make the Horizontal Plates level or horizontal, by means of the two Spirit-Levels, and the four Screws in the Cross-Pedestal. This being done, you move the Meridian Semicircle, by means of the Meridian Handle, so as to raise the Equatorial Plates to the Elevation of the Equator of the Place; which is equal to the Complement of the Latitude (and which, if not known, may likewise be found by this Instrument, as shall be afterwards

shewn). And thus the Instrument is ready for Observation.

To find the Hour of the Day, and Meridian of the Place.

First find, from astronomical Tables, the Sun's Declination for the Day, and for that particular Time of the Day; then set the Declination-Semicircle to the Declination of the Sun, taking particular Notice whether it is North or South, and set the Declination-Semicircle accordingly.

You then turn about the Horizontal Handle, and the Equatorial Handle, both at the same time, till you find the Sun precisely concentrical with the Field of the Telescope. If you have a Clock or Watch at hand, mark that Instant of Time; and by looking upon the Equatorial Plate, and *Nonius* Index, you will find the Hour and Minute of the Day, which comparing with the Time shewn by the Clock or Watch, shews how much either of them differ from the Sun. In this manner you find the Hour of the Day.

Now, in order to find the Meridian of the Place, and consequently to have a Mark, by which you may always know your Meridian again, you first move the Equatorial Plate, by means of the Equatorial Handle, till the Meridian of the Plate, or Hour-line of 12. is in the Middle of the *Nonius* Index; and then, by turning about the Declination-Handle till the Telescope comes down to the Horizon, you observe the Place or Point which is then in the Middle of the Field of the Telescope; and a supposed Line drawn from the Center of this Field to that Point in
the

the Horizon, is your Meridian Line. The best time of the Day for making this Observation for finding your Meridian, is about three Hours before Noon, or as much after Noon. The Meridian of the Place may be found by this Method so exact, that it will not differ at any time from the true Meridian above 10'' of Time; and if a proper Allowance be made for the Refraction at the time of Observation, it may be found much more exact. This Line thus found will be of Use to save Trouble afterwards; and is, indeed, the Foundation of all astronomical Observations.

To find a Star or Planet in the Day-time, even at Noon-day.

The Instrument remaining as rectified in the last Experiment, you set the Declination-Semicircle to the Declination of the Star or Planet you want to see; and then you set the Equatorial Plate to the Right Ascension of the Star or Planet at that time, and, looking thro' the Telescope, you will see the Star or Planet; and after you have once got it into the Field, you cannot lose it: For, as the diurnal Motion of a Star is parallel to the Equator, by your moving the Equatorial Handle so as to follow it, you will at any time, while it is above the Horizon, recover it, if it be gone out of the Field.

The easiest Method for seeing a Star or Planet in the Day-time is this: Your Instrument being adjusted as before-directed, you bring the Telescope down so as to look directly at your Meridian Mark; and then you set it to the Declination, and Right Ascension, as before-mentioned.

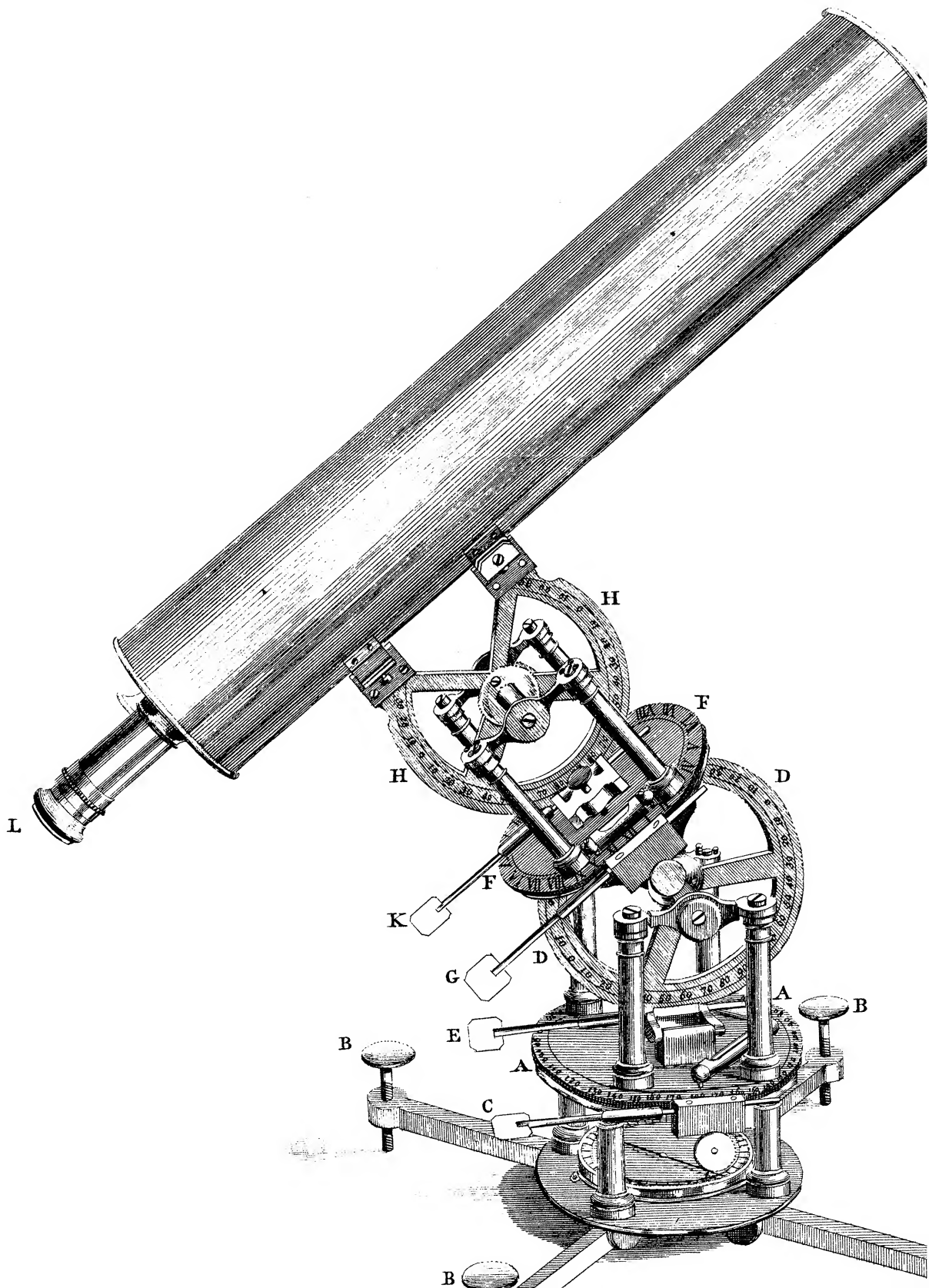
By this Instrument most of the Stars of the first and second Magnitude have been seen even at Mid-day,

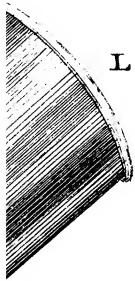
day, and the Sun shining bright; as also *Mercury*, *Venus*, and *Jupiter*: *Saturn* and *Mars* are not so easy to be seen, upon account of the Faintness of their Light, except when the Sun is but a few Hours above the Horizon.

And in the same manner in the Night-time, when you can see a Star, Planet, or any new Phænomenon, such as a Comet, you may find its Declination and Right Ascension immediately, by turning about the Equatorial Handle, and Declination-Handle, till you see the Star, Planet, or Phænomenon; and then, looking upon the Equatorial Plate, you find its Right Ascension in time; and you find, upon the Declination-Semicircle, its Declination in Degrees and Minutes.

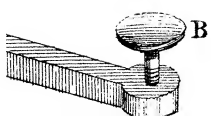
In order to have the other Uses of this Instrument, you must make the Equatorial Plates become parallel to the Horizontal Plates; and then this Instrument becomes an *Equal Altitude Instrument*, a *Transit Instrument*, a *Theodolite*, a *Quadrant*, an *Azimuth Instrument*, and a *Level*. The manner of applying it to these different Purposes is too obvious to need any Explanation.

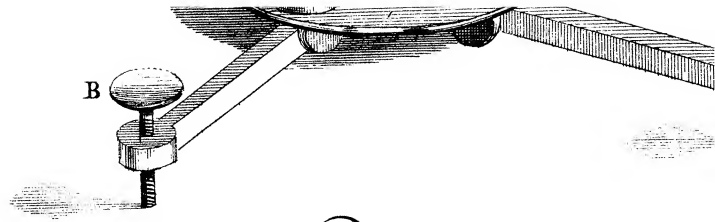
As there is also a Box with a magnetic Needle fastened in the lower Plate of this Instrument, by it you may adjust the Instrument nearly in the Meridian; and by it likewise you may find the Variation of the Needle: If you set the Horizontal Meridian, and the Equatorial Meridian, in the Middle of their *Nonius* Indexes, and direct your Telescope to your Meridian Mark, you observe how many Degrees from the Meridian of the Box the Needle points at; and this Distance or Difference is the Variation of the Needle.



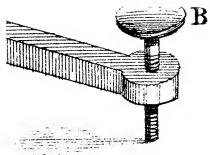


B

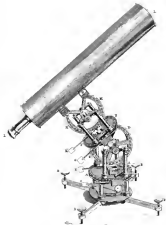




Equatorial Telescope



J. Mynde sculp.



Equatorial Telescope